INDUSTRIAL EDUCATION.

The Educational Value of Manual Training.

[Read by Rev. W. B. Olesen at the Social Science Association, Feb. 20, 1888.]

The scholastic theory of education proceeds on the assumption that the end of education is the acquisition of knowledge, rather than the generation of power,—knowledge standing for what is obtained from books, and power for what is obtained from things and from skill in dealing with things. Thus courses of study are arranged with reference to the absorbing power of the human mind. Ample time is allotted to arithmetic, geography, spelling, language, grammar, and elementary science. The brain absorbs facts in these directions that train the memory and discipline the perceptive and reasoning faculties. A considerable store of information is thus accumulated by the process of absorption. This absorbing side of human faculty is what is stimulated by our schools, as at present organized. Training for the expressing side of human faculty is only incidentally provided. For, it is held, if the brain be thoroughly trained, then the hands and the voice, our only avenues for expressing what the brain has absorbed, will somehow take care of themselves. But it is evident that they do not take care of themselves. The untrained hand is not the willing and efficient servant of the trained brain. In so far as hand and voice are not schooled to obey readily and accurately the mandate of the brain, just so far is brain-culture incomplete and wasteful. The hand and voice are altogether too essential to the adequate employment of brain force, to allow of their neglect. Our scholastic system of education accordingly makes provision, albeit very scant provision, for the expressing of ideas through the medium of penmanship, drawing, and music.

To the utilitarian, this seems a very bare record for our schools to achieve. So far as practical fitness for life and its employments is concerned, these forms of expressing brain power are all too limited. They render it possible for boys to become clerks, and copyists, and accountants, and, as a natural result, we find these occupations overcrowded. There are thousands of boys graduated annually from city schools throughout the United States, whose sole manual skill consists in the ability to write a reasonably fair hand. Their purely scholastic training has given them a bias away from manual employment, if it does not likewise in many instances create a positive distaste for work. And yet as a writer in the Andover *Review* has said, "A majority of children in schools which are supported at public expense are from families of working people, and will themselves engage in manual labor." "Labor is the inevitable lot of the majority," writes Froude; and, "the stubborn fact remains that after the years which have been spent at school, the pupil is launched into life as unable as when he first entered the school-door to earn a sixpence, possessing neither skill nor knowledge for which any employer in England will be willing to hire his services." Every one, after a little thought, must be impressed with the manifold uses to which the hand is put, in the practical occupations of life. The United States census enumerates one hundred and seventy-two occupations as manufactures and mechanical and mining industries. All these occupations call for a certain mastery of the hand by the brain which the schools do not convey. The inventive faculty is not stimulated by the ordinary course of study. It was declared at an annual meeting of the American Social Science Association that scarcely any inventors have been taught in the public schools.

With the most primitive appliances, and at the greatest possible inconvenience, boys will invent and construct things for their own amusement, that fairly amaze good mechanics. I have seen a native boy with a rubber band and a shingle and a one-bladed jack-knife, construct a steamboat that would move two feet across the water of its own volition. I have seen Hawaiian boys make a better croquet set out of monkey-pod wood, with the sole help of a jack-knife, than could be bought in the stores for $10.

And yet the schools make only slight recognition of this natural tendency of boy nature in the direction of inventive and constructive skill. That surely cannot be the natural method of education which essentially ignores one whole side of human faculty, and discourages, rather than promotes, the expressing power of the human brain.

It was due to the conviction that a comprehensive education should provide for this neglected faculty, that manual training schools were established in various large cities throughout the United States. They were not engrafted on the public system, but were established and have been maintained very largely at the expense of individuals. The Chicago Manual Training School was established by the munificence and under the direction of "The Commercial Club," an organization of sixty merchants. The Worcester Free Institute was likewise established and endowed by several wealthy manufacturers of Worcester. The New York Trade Schools were conceived by a master builder, who has maintained them thus far at his own expense. In these various schools the distinctive feature is the "education of the mind, and of the hand as the agent of the mind. The time of the pupil in school is about equally divided between the study of books and the study of things; between the academic work on the one hand and the drawing and shop-work on the other. The shop is as much a school as is any other part of the establishment."

The abandonment of the apprenticeship system, due to the progress of inventions and the development of manufactures, has likewise had its influence in turning the attention of the public toward measures to supply this loss in the industrial system.

"Our ancestors," writes Froude, "whatever their other shortcomings, understood what they meant perfectly well. The majority of the people had to live, as they always must, by bodily labor; therefore every boy was as early as convenient set to labor. He was not permitted to idle about the streets or lanes. He was apprenticed was sent to a farm, or if his wits were were sharper, he was allotted to the village carpenter, bricklayer, tailor, shoemaker, or whatever it might be. He was instructed in some positive calling by which he could earn his bread and become a profitable member of the commonwealth."

The schools in Great Britain and the United States were adjusted to the condition of things under the apprenticeship system. But they have not yet adjusted themselves to the new conditions induced by the abandonment of that system. "The ability to do something and not merely to answer questions, must still be the backbone of the education of every boy who has to earn his bread by manual labor." This conviction has been influential in the establishment of manual training schools, and in the introduction of technical instruction in such schools as Sibley College, the School of Mechanical Engineering and of the Mechanic Arts at Cornell University; the School of Mechanic Arts at the Massachusetts Institute of Technology, as also the Lowell School of Practical Design in the same institution; the Manual Training School at Washington University, St. Louis; and numerous other schools, notably State institutions. Successful experiments have also been made in Boston, New Haven and elsewhere, in providing workshop instruction for certain hours in the week for a limited number of pupils attending the public schools. Much of the current criticism of American and English public schools is, that while education is essentially compulsory, it is not practical enough to justify this compulsory attendance on the part of the majority of school children. It is not prepa- tive enough for the life that the m- jority of children must enter on leav ing school, neither is it productive o best results in the limited trainin that the schools are able to furnish the children of the working classes. Such children generally drop out of school during the grammar school course, with but indifferent ability to read, write and cipher. With some form of manual training that would in a measure take the place of the abandoned apprenticeship system, modern public school training would be more productive of good results for the classes that need public schooling most.

Writes Edward Atkinson, "We are training no American craftsmen, and unless we devise better methods than the old and now obsolete apprentice system, much of the perfection of our almost automatic mechanism will have been achieved at the cost not only of the manual but also of the mental development of our men."

The almost phenomenal development of manual training in Europe has been occasioned largely by the industrial necessities of the various nations. For example, it was found that the people of Southern Tyrol were consuming olive wood for fuel, while their neighbors in Italy were manufacturing from it numerous useful articles. An industrial school was accordingly established at Arco and now the olive wood work of Arco is in great demand all over the world. Dr. Exner of Vienna, who has started many trade-schools throughout Austria, cites facts of the most convincing character to show that the immediate effect of trade-schools has been what was hoped and expected, viz., to revive drooping industries and to make new ones. This has likewise been the result in France and Germany, the French above all people having promoted distinctively industrial training.

It can hardly be said that industrial necessities have operated in America in advancing the cause of manual training. Perhaps the only school that has been established with a view to improve the quality of the work of young mechanics is the New York Trade School. So far then as the purpose of this paper is concerned, manual training may be said to have had its origin in the two convictions, that present methods of instruction in public schools are incomplete, failing to recognize, as they do, the importance of hand-training as an essential adjunct to brain-culture, and that present methods are not preparative enough for the life that the majority of public school children must enter.

It is in no sense the object of this paper, in dealing with the educational value of manual training, to urge that our schools should become trade schools, and give instruction in specified trades, with the avowed purpose of fitting pupils for such pursuits. This is not essential in order that manual training may be incorporated into our courses of study. For, from an educational stand-point, manual training does not mean the manufacture of so many carpenters and machinists and printers, but the acquirement of skill and ingenuity in manipulation of objects and tools as a part of elementary education. It is important that the hand should have as varied a training as the brain, and that pupils should be equipped with manual as well as with mental readiness and power. The great commendation of manual training is that it practically broadens and enhances elementary education.

The absorption of food by the -gestive organs is an aimless and val- less thing, physiologically considere- unless that food is transmuted into physical energy through the circulatory, and nervous, and muscular systems. And so knowledge, at least in its practical bearings, is impotent, unless the power to utilize and to supplement that knowledge go along with it. Mental power will be stimulated to that degree that the expressing power of the brain is diversified and enlarged. The reflex influence on the brain of a new acquirement by the hand will invigorate the mind and prevent in large measure what may be called mental surfeiting.

The intellectual stimulus which manual training exerts is not inconsiderable. Dr. Belfield, of the Chicago Manual Training School, formerly a successful teacher in the public schools, declares "that three years of a manual training school will give at least as much purely intellectual growth as three years of the ordinary high school, because every hour, whether spent in the class-room, the drawing-room, or in the shop, is an hour devoted to intellectual training. The shop educates hand and brain." Dr. Woodward, of the St. Louis Manual Training School, writes: "Success in drawing or shop-work has often had the effect of arousing the ambition in mathematics and history. The habit of working from drawings and to nice measurements has given the students a confidence in themselves altogether new."

Writes Ruskin, "Let a youth once learn to take a straight shaving off a plank, or draw a fine curve without faltering, or lay a brick level in its mortar, and he has learned a multitude of other matters which no lips of man could ever teach him."

It has been the uniform experience of manual training schools, in which the work-shop has been kept true to its educational purpose, that quite as satisfactory progress is made with the three hours of class-room drill, as in other schools where the entire school time is devoted to the study and use of books. It is claimed in Massachusetts that even in the reform schools, which are not supposed to enter the contest with any marked intellectual advantage, there is as rapid progress with the morning devoted to the school-room and the afternoon to the shop, as with scholars who spend six hours over their books.

Dr. Wells of the Massachusetts Emergency and Hygiene Association is authority for the statement that "In England, the half-time system provides for three hours attendance in school, and for the rest of the working hours, employment in factories, in shops, and on farms. Over one hundred thousand children are thus taught, and it is found that they make as much progress as those who attend school six hours a day." In the Artisans' School at Rotterdam, an experience of seven years has demonstrated that boys who are occupied one-half the day with books in the school, and the remaining half with tools in the laboratories, make about as rapid intellectual progress as those of equal ability who spend the whole day in study and recitation.

The educational value of manual training depends upon the fidelity with which that training is conducted as auxiliary to the work of the school-room. There is right here an important distinction to be drawn between manual training and industrial training. Manual training is the education of the hand; industrial training is the preparation of the individual to follow a particular trade. One teaches a boy how to do things and to command the use of his hand as an instrument of the brain; the other teaches how to do some particular thing and how to use the hand in a single line of construction. As these two kinds of training are seen in actual operation, the line of demarcation is well-nigh obliterated between them, for in many manual training schools special lines of industrial employment come to be emphasized, while on the other hand, in industrial schools, skill in other directions than of certain special trades finds encouragement. An industrial school, however, is more apt to become productive than instructive. Local industries color the course in most industrial schools. One becomes a school for watch-making, another for weaving and so on. The tendency is strong in most manual training schools, however, to make the course in the work-shop constructive rather than instructive. Thus the Worcester Free Institute, which was modeled after the so-called Russian system, being mainly instructive in its features, has gradually modified its course of work-shop instruction so that it is now largely constructive. There is a preliminary course in carpentry, which is followed by employment in the Washburn Machine Works, where the students manufacture for the trade. Undoubtedly the existence of the Machine Works, where mechanics are constantly filling orders for certain classes of machine work, has had the effect of narrowing the type of instruction conveyed.

It is undoubtedly harmful to a course of workshop instruction to make it productive. This limits its scope to the manufacture of salable products, and at once raises the question as to which is more profitable from a practical as well as educational standpoint, to employ the resources and appliances of a school in the manufacture of a few lines of salable articles, or in the systematic training of the pupils in the care and use of tools.

It is strenuously advocated that the best way to teach the use of tools is in the manufacture of some useful article. But is this sound, educationally? Does not the construction of any salable product limit the scope for the use of tools, both as to variety of tools and the variety of uses of particular tools? Does it not concentrate the attention on the construction rather than on the supposed instruction to be conveyed? Does not the system of teaching the use of tools by the constructive method fail of its end by reason of local necessities which restrict the construction to a few articles because they are salable and in demand? On the other hand, is not that method sounder, educationally, which insists on a thorough course of tool instruction? Is not the ability to use tools accurately a better preparation for a mechanical calling than the ability to construct specified articles? Is it not better that boys in workshops should devote the time that would be spent in manufacturing certain salable articles, in additional drill on the same material in the use of tools?

Thus, a board an inch thick, twelve inches wide and three feet long will be about enough to make the sides, front and bottom of an ordinary table drawer. To construct such a drawer the stuff must be planed, sawed and joined at the four corners by dovetailing. According to the construction method, until a fairly good number of drawers have been made, there will be considerable waste of material and a quite indifferent quality of drawer constructed. For while aiming at the making of drawers, incidentally, planing and sawing and joinery must also be taught, thus making the instruction complex and insufficient in any direction.

Let us see what can be done with the same material according to the instruction method. In the first place, it can be made to serve excellently for a systematic drill in the use of planes. If several such boards were thus used up, it would be no more probably than would be spoiled in the effort to make the first few boxes, and the results in the skill in handling a plane would be far more valuable. Again, this same material would suffice for a much more satisfactory drill in the use of saws than can be obtained in making many drawers; for in one case the saw might only be used three times, while in the other it might be easily used three hundred and sixty times. Again, in making one drawer, only four dovetail joints can be made, and it would compel the making of many drawers before real skill would be acquired in making an accurately fitting joint. On the other hand, were this material to be used, after being planed, and sawed into inch strips, it would suffice for a most profitable and accurate drill in dove-tailing.

The issue is plainly, whether it is wiser and in every way better to teach a boy how to plane, and saw, and make good joints by teaching him how to make a table-drawer, or to teach him how to properly prepare his material and to fit himself for the construction of table drawers or any similar work, by teaching him thoroughly well how to plane and saw and handle his chisel. The first method compels the making of things, and quickly degenerates into the making of salable articles, and eventually results in making the work-shop productive and a source of revenue, whereas as an educational factor, it would no more be productive than a class in language or arithmetic. The second method lays stress on the handling and care of tools, affording ample time and varied exercises to promote such knowledge and skill as every craftsman should possess. Teach a boy how to sharpen his tools, how to care for them, how to adjust them skilfully to given demands, and then concentrate his attention and time on the varied operations into which such tools enter as factors, and you have fitted him to make not only a table-drawer, but anything which a fertile and inventive mind may suggest.

In this discussion between the relative merits of the construction and instruction systems of manual training, I have had in mind especially the department of carpentry, as being common to all systems of manual training. But the principles which underlie the instruction theory are applicable to any other department.

Thus in printing, the prime thing to be gained is rapidity and accuracy in type-setting and distributing. Hence where this department is made productive, the pressure of regular job-work or newspaper printing, sensibly limits the drill in composing and distributing. The teacher cannot give the proper personal attention to each pupil at each stage of progress while under the pressure of job-work. Again, it is far more beneficial to the boy, and in schools it is to be supposed that the training is for the boy and not for revenue, for such boy to stand at the case, and set up and distribute over and over again, and learn one step at a time, than for him to see his work on paper, and to dabble indifferently in all the processes of the printing-room. And so too in blacksmithing, it is better that one step should be thoroughly well mastered at a time. This is but following the practice of the old apprentice system. "Strike while the iron is hot" is a good enough adage, and had its first utterance, likely enough, over a hot iron on an anvil, but what blacksmith would teach a novice how to strike on a job that would be spoiled by clumsiness or delay? Striking can be taught on cold bars of iron, and so too with many of the other processes of a blacksmith's shop. And when the time comes for training in the use of the forge such matters as temperature and the proper handling of hot iron, can be taught according to the instruction method to much better purpose than where the necessity of filling an order necessitates primary attention to construction. The instruction method looks at the boy, and aims to endow him with mechanical skill; the construction method looks at the thing to be made quite as much as to the boy who is expected to be benefited by the making.

But is it not better that boys should be taught how to make some real thing, than be constantly taught principles? But this is not what the instruction method undertakes. It rather teaches successively the steps which must be taken in the making of a real thing. And when those steps are mastered, it does not forbid or prevent the manufacture of some article to show the boy's skill in the use of tools. It rather encourages such manufacture as the crowning course of instruction conveyed, and then, true to its principles, the workshop where the instruction method prevails graduates that class and receives its next assignment of untrained boys.

The educational value of the instruction method of manual training is very considerable. It is scientific in its line of procedure, and conduces to accuracy and rapidity and skill in the matter of construction. It insists on faithfulness and thoroughness and attention. It imparts self-reliance and arouses mental activity. It promotes physical development, and generates real power in the individual.

The adaptability of manual training as an adjunct to a public school system is a controverted matter. It is objected that such a department cannot be grafted on to the public school system without seriously curtailing the present course of study. It is pertinent, right at this point, to ask whether in the interests of a useful education, the present course of study might not be advantageously curtailed to make room for a type of training so likely to prove practically beneficial as manual training. Where the experiment has been tried, the loss has not seemed a very real one. A new departure has been entered upon in New York City, whereby manual training is to be added to the course in twelve of the grammar schools, such studies as geography and history being much abridged, and the study of reading in connection with the new system of supplementary readers being somewhat modified in order to make way for the experiment.

A more serious objection to the adoption of manual training as an integral part of the public school system is its expensiveness. On this account, principally, the introduction of this style of training into the Brooklyn public school has been delayed. It has been fairly well shown, however, by Chas. G. Leland of Philadelphia that manual training is much less expensive than is generally supposed. But assuming that it would add considerably to the expense of the public school system, it certainly would seem to be so clearly in the interests of public economy as to justify the outlay. There is no hesitation in making large outlays for public buildings, and improved facilities for transportation, such as tunnels and bridges, and in otherwise providing for what is believed to be for the public convenience, and the spirit of a wise expenditure in such matters should not falter at the threshhold of the public school. It is vastly more essential to the perpetuity of our social institutions and usages that the youth be trained into habits of industry and skill in handicraft, than that costly prisons and asylums be erected; for it is a remarkable fact, that of the class who, having an education, are yet behind prison bars, those who have had trade instruction, such as mechanics and artisans, generally, are greatly in the minority.

It is natural that manual training in the public schools should confront the objections urged by trades-unions and mechanics, viz., that all the mechanical employments will become over-crowded; that the wages of mechanics will inevitably suffer reduction; and all those other objections that have been successful in some States in breaking up the system of convict labor. But there is no reason why there should be monopolies of labor, any more than of capital. A sugar trust is no more inimical to public welfare than a possible labor trust. Moreover, there is no reason in justice, why ninety-nine per cent. of our common school graduates should enter on life with a training that gives them a bias toward copying, and book-keeping, and clerking, any more than that a fair proportion should enter life with a training that gives them a bias toward the 172 mechanical and mining employments enumerated in the United States census. For it must be borne in mind that manual training, according to the instruction method, does not interfere with items of wages and production, inasmuch as it is no part of the aim of such method to enter the market with salable goods. The only competition is that which skilled labor must always meet, and without which it must inevitably suffer deterioration. I refer to the product of the schools, viz.: the alert, ambitious youth, bound to make his way in life somehow, and fortunately equipped in greater or less measure with manual aptitude for some form of employment that he must inevitably enter. T[illegible] the schools should impart such a [illegible]g, is an injury to no one, but a great public benefit, stimulating industry, enriching a nation's resources, and utilizing, in the interests of society and morality, a long-neglected but essential side of human faculty.

Damages Claimed.

In July, 1884, the whaling brig Isabella was wrecked in Hudson Strait. The crew of twenty-four men, after great privation and suffering, succeeded in reaching the Island of Arkolear. The schooner Roswell King of New London, and the schooner Era, both vessels owned by Messrs. A. C. Williams & Co. of New London, rescued and cared for the crew. The delay occasioned by the care of the shipwrecked crew caused the schooners to be caught in the ice, and they did not get out for eleven months, having the crew on board the whole time. A bill has been introduced in Congress to pay the owners of the schooners $18,000 for losses sustained.

Fighting Temperance.

From Kingston, Canada, comes the following account of violent opposition to the local option prohibitory law: In retaliation for the hard fight that is being made by the temperance people of Leeds county eleven buildings have been burned at Irish Creek, the Methodist church and a tannery have been burned at Kemptville, and five constables have been stoned and assaulted. Dr. Ferguson, M. P., and three other men, one of them a minister, were assailed and threatened with murder, and two deacons of a Baptist church have been warned to dismiss their ministers or have their churches burned. The temperance people are undismayed, however, and have had forty or fifty tavern keepers fined, have sent three offenders to the penitentiary, and have had the assailants of the constables fined $800.

The Congo Protesting Against Rum.

The deputation from the Queen of Amatonga waited upon the Archbishop of Canterbury a few days since and described the harm inflicted upon the natives by the liquor traffic. Mr. Grantham, the Queen's adviser, who was one of the speakers, described the degradation into which this most intelligent race of Kaffirs had fallen until the native Queen had forbidden the sale of liquor by her own subjects. Fathers, he said, were constantly pledging their daughters, on security for debts of liquor.

The trade was now almost entirely in the hands of the Portuguese, and the Queen wanted to know whether the English, like the Portuguese, were desirous of destroying them with their poison. She feared such was the case, one of her Indunas having recently been killed by drinking spirits given him by an Englishman. The Archbishop assured the deputation of the sympathy of all in England who had the welfare of the native races at heart with the efforts now being made by the Que- -matonga and her people to r- -mselves of the dangers, moral and physical, which threatened them through the unchecked liquor traffic.—[N. Y. Evangelist.

It was Marshal Martinez Campos who warned the Spanish Government of Isabella's conspiracy against the Queen regent and her baby, the King. By the way, the Pope has just hinted to Don Carlos that religion, chivalry, and patriotism alike require he should cease to conspire against that infant monarch's throne. Carlos doesn't think the Pope competent to give advice on secular matters.

Mrs. Elizabeth Carroll of Warren, Ind., claims to have been born in Pennsylvania in 1774. Her husband was a soldier in the war of 1812. There is good reason to think that Mrs. Carroll is really 113 years old, although she is as active as most women of 60.